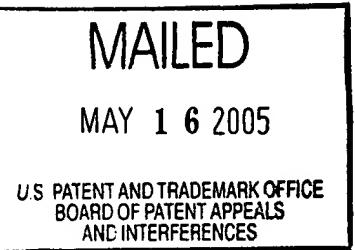


The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

*Ex parte* MASAHIRO OKU,  
YUICHIRO OGAWA and KAZUYA HATAKEYAMA



Appeal No. 2005-0468  
Application 09/347,525

HEARD: April 21, 2005

Before KIMLIN, WARREN and PAWLICKOWSKI, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

*Decision on Appeal*

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1 through 4, 6, 8 and 13 through 15. Claims 7 and 9 through 12 are also of record and have been withdrawn from consideration by the examiner under 37 CFR § 1.142(b).

Claims 1 and 8 illustrate appellants' invention and are representative of the claims on appeal:

1. A method of laminating band-shaped uncured rubber materials to form a laminated rubber member having a given sectional shape by helically winding a band-shaped uncured rubber material extruded through an extruder on a rotating support, which comprises using two or more rubber compositions indicating different moduli after the curing as a rubbers material fed to the extruder;

extruding a first rubber material through the extruder as a first band-shaped rubber member and helically winding the first band-shaped rubber member on the rotating support along

a rotating axial direction of the support so as to overlap at least widthwise edge portions of the wound rubber members with each other to form a first rubber layer; and

continuously extruding the first rubber material and adding a second rubber material through the extruder to create a blend of the first rubber material and the second rubber material, and stepwise or gradually increasing a blending ratio of the second rubber material to the first rubber material as a second band-shaped member while holding the same extrusion sectional shape and helically winding on the first rubber layer while overlapping with at least a part of the first rubber layer and overlapping at least widthwise edge portions of the wound second band-shaped rubber member with each other to form a second rubber layer.

8. The method according to claim 1, wherein among three rubber materials, the first rubber material is a rubber composition for a tread under cushion in the cured tire, the second rubber material is a rubber composition for a tread base, and the third rubber material is a rubber composition for a tread cap.

The references relied on by the examiner are:

|        |           |               |
|--------|-----------|---------------|
| Hanson | 2,849,049 | Aug. 26, 1958 |
| Deist  | 3,170,499 | Feb. 23, 1965 |
| Okada  | 6,039,826 | Mar. 21, 2000 |

The examiner has rejected appealed claims 1 through 4, 6, 8 and 13 through 15 under 35 U.S.C. § 103(a) as being unpatentable over Deist alone or further in view of Hanson and Okada (answer, pages 3-8).

Appellants state that each of the appealed claims “is separately patentable” and, in this respect, separately groups each of claims 1 through 4, 6 and 8, and groups claims 13 through 15 (brief, pages 8-9). Thus, we decide this appeal based on appealed claims 1 through 4, 6, 8 and 13. 37 CFR § 1.192(c)(7) (2003); *see also* 37 CFR § 41.37(c)(1)(vii) (effective September 13, 2004; 69 Fed. Reg. 49960 (August 12, 2004); 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)).

We affirm.

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the answer and to the brief<sup>1</sup> and reply brief for a complete exposition thereof.

*Opinion*

We have carefully reviewed the record on this appeal and based thereon find ourselves in

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<sup>1</sup> We have considered the brief filed March 18, 2004.

agreement with the supported position advanced by the examiner that, *prima facie*, the claimed method of laminating band-shaped uncured rubber materials to form a laminated rubber member having a given sectional shape encompassed by appealed claims 1 through 4, 6, 8 and 13 would have been obvious over the combined teachings of Deist, Hanson and Okada to one of ordinary skill in this art at the time the claimed invention was made. In view of the established *prima facie* case of obviousness, we again consider the record as a whole with respect to this ground of rejection in light of appellants' rebuttal arguments in the brief and reply brief. *See generally, In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

The principal issue in this appeal is whether the following passage in Deist would have reasonably suggested to one of ordinary skill in this art to use an extruder in place of breakdown mills **40, 41, 42**, blending mill **10** and ribbon calender **24** which provides a diamond-shaped strip **35** as depicted in Deist **FIG. 1**, which is the first embodiment of Deist, and in place of blending mill **70**, which has hoppers **75, 76, 77**, that provides a diamond-shaped ribbon **93** as depicted in Deist **FIG. 2**, which is the second embodiment of Deist, as described at col. 3, l. 29, to col. 7, l. 16, in connection with col. 2, l. 24, to col. 3, l. 10:

One obvious variation which might be mentioned would be the utilization of extruder means in place of one or more of the mills and calender as referred to in the embodiments described wherein feed to the extruder means would be controlled as described with reference to feeding the mills and calender. [Col. 7, ll. 34-40.]

Pointing to the second embodiment of Deist as an example, the examiner takes the position that one of ordinary skill in this art following this "suggestion to use extruders, . . . would have replaced the mill with an extruder, feed being controlled with controlled hoppers as described" in the reference (answer, page 6).

With respect to the above disclosure, appellants submit that "Deist specifically teaches away from the invention," that is, "Deist does not show extruders," arguing that "[a]lthough Deist mentions using extruders, such is only mentioned in passing that extruder means may be used in place of one or more of the mills and calenders," contending that "[t]his throwaway passage only suggests a device similar to that shown in Fig. 1 of Deist" which replaces "the blending mills 40, 41, 42 and 10, and calender 24 with extruders," that is, "five separate

extruders; one for each of” the aforementioned devices (brief, page 12). In this respect, appellants point out that “Deist’s repeated insistence of the importance of the mastication of the material by the action of the driven mill to obtain a tacky plasticizer mass with an appropriate temperature and consistency” (*id.*; reply brief pages 1-2). Appellants makes a similar argument with respect to the second embodiment illustrated in Deist **FIG. 2** (brief, page 12). Thus, appellants urge that the “two embodiments of Deist show that Deist limited his disclosure to . . . [mills] and did not contemplate extruders as a viable alternative” (*id.*). Appellants further point to the use of extruders in Hansen (*id.*, pages 12-13), correctly noting that Hansen is not referred to by Deist for extruders (col. 4, ll. 15-18, and col. 7, ll. 17-25). Appellants submit that the “failure to incorporate extruders into specific embodiments in Deist raises an inference that Deist did not see extruders as a solution in his disclosure,” arguing that “the fact that Deist does not show actual use of extruders suggests to one of ordinary skill in the art that Deist would not see extruders as a solution” (brief, page 13). In this respect, appellants point out that Deist uses “knives” to control the rate of supply of rubber materials from the breakdown mills to the blending mill and to control the formation of the rubber strip in the two embodiments (*id.*).

The examiner responds that Deist does not teach away from using an extruder because one of ordinary skill in the art would have recognized that regardless of the modifications of Deist’s first embodiment if an extruder was used, “blending would still be occurring” therein (answer, pages 8-9). The examiner further finds that this person could have modified the second embodiment by using “a single extruding means with a controlled feed from a plurality of hoppers” (answer, page 9). In these respects, the examiner takes the position that “extrusion is *extremely* well known and well characterized in forming tire compounds, it not being considered beyond the skill level of the ordinary artisan to suitably extrude a tire compound strip,” and that this person would be “fully capable of forming strips” (*id.*).

We initially interpret the language “form a laminated rubber member having a given sectional shape by helically winding a band-shaped uncured rubber material extruded through an extruder on a rotating support” in the preamble of appealed claim 1, and the further language “extruding a . . . rubber material through an extruder as a . . . band-shaped rubber member and helically winding the . . . rubber member on the rotating support” in the body thereof, on which

all other appealed claims depend, the same and similar language appearing in claims 2 through 4 and 13, by giving the terms the broadest reasonable interpretation in light of the written description in the specification as it would be interpreted by one of ordinary skill in this art. *See In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). We determine that the plain language of the claims specifies that the band-shaped uncured rubber material member that is helically wound must be that formed by extrusion through an extruder, which language, as appellants contend (reply brief, page 1), requires that a single extruder forms the band-shaped member. The plain language of the claims further specifies that the individual uncured rubber materials are extruded individually and as blended as required through the single extruder. However, there is no limitation in the appealed claims which specifies the manner in which any of the individual uncured rubber materials are processed prior to feeding such materials into the required extruder, or the manner that the band-shaped rubber material member is shaped subsequent to this extruder, and the transitional term “comprising” opens the claims to encompass methods that include steps, elements and materials in addition to those specified. *See, e.g., In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) (“As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term ‘comprises’ permits the *inclusion* of other steps, elements, or materials.”). Thus, the appealed claims encompass methods wherein the individual uncured rubber materials are processed in the required extruder as well as methods wherein the individual uncured rubber materials are processed in one or more mills and/or extruders and then fed into the required extruder, and the extruded rubber member is helically wound as extruded through the die of the required extruder or as modified by knives and/or calenders subsequent to the die.

The determination of the scope and content of the combined teachings of Deist, Hanson and Okada requires that, as a matter of fact, the references must be considered for all of the specific teachings therein as well as the inferences one of ordinary skill in this art would have reasonably been expected to draw therefrom, *see In re Fritch*, 972 F.2d 1260, 1264-65, 23 USPQ2d 1780, 1782-83 (Fed. Cir. 1992); *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968); *In re Aller*, 220 F.2d 454, 458-59, 105 USPQ 233, 237 (CCPA 1955),

presuming skill on the part of this person. *In re Sovish*, 769 F.2d 738, 743, 226 USPQ 771, 774 (Fed. Cir. 1985). We find that, as pointed out by the examiner, one of ordinary skill in this art at the time the claimed invention was made would have been armed with the knowledge of preparing strips or ribbons of uncured rubber material for helically winding on a rotating support to form a laminated rubber member, by the extrusion of uncured rubber materials through an extruder, which proposition is supported on this record by the substantial evidence of so extruding such material through single and multiple extruders, equipped with dies or other means, including knives and calenders, to control the shape of the strip or ribbon, in Hansen (e.g., col. 2, ll. 36-51, col. 4, ll. 32-61, and col. 5, ll. 26-61) and Okada (e.g., col. 3, ll. 27-54, col. 6, ll. 3-12, and col. 6, l. 36, to col. 7, l. 9).

Therefore, we are of the opinion that as a matter of fact, this person would have reasonably found in the teachings at col. 7, ll. 34-40, of Deist the teaching that a modification of the processes disclosed in the reference is the use of one or more extruders in place of one or more of the mills and calender in the embodiments with the direction that “feed to the extruder means would be controlled as described with reference to feeding the mills and calenders.” We further find that one of ordinary skill in the art would have taken into account the other teachings of Deist in these respects (e.g., cols. 2, 3 and 7). *See B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996) (“When obviousness is based on a particular prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. [Citation omitted.] This suggestion or motivation need not be expressly stated. [Citation omitted.]”).

Based on this record, we agree with the position of the examiner. We are not persuaded otherwise by appellants’ arguments. We know of no authority which supports appellants’ position that one of ordinary skill in the art would not have considered a clear teaching or suggestion of an embodiment in a reference in the absence of an actual illustrative embodiment therein, and indeed, there is authority to the contrary. *See, e.g., In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976) (“The fact that neither of the references expressly discloses asymmetrical dialkyl moieties is not controlling; the question under 35 USC 103 is not merely what the references expressly teach, but what they would have suggested to one of

ordinary skill in the art at the time the claimed invention was made. [Citation omitted.]”). It is also well settled that one of ordinary skill in the art would have considered unpreferred embodiments, *see Lamberti*, 545 F.2d at 750, 192 USPQ at 280; *In re Boe*, 355 F.2d 961, 964, 148 USPQ 507, 510 (CCPA 1966), unless the reference criticizes, discredits or otherwise discourages the selection of the unpreferred embodiment, thereby teaching away from that embodiment. *See In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1145-46 (Fed. Cir. 2004).

In the presence case, not only does Deist specifically teach the alternative embodiment of using extruder means but includes direction with respect to that use. Moreover, we fail to find in appellants' arguments alleging a blending problem and a strip or ribbon problem if extruders are employed in place of the mills and calenders in the two embodiments of Deist (brief, pages 12 and 13; reply brief, page 2), any evidence that such would in fact occur. To the contrary, as the examiner points out, one of ordinary skill in the art would have expected that the blending requirements and the strip or ribbon formation requirements set forth in the Deist embodiments can be achieved by extruder means, and indeed, Hansen and Okada evince the mixing of rubber stock and the shaping of the uncured strip or ribbon helically wound on a rotating support by an extruder and the die thereof or by other means, including knives and/or calendering, employed subsequent to the extruder.

Appellants submit, with respect to the plain language of the limitation to gradually add a different rubber material to a rubber material “to create a blend” of the two rubber materials and “stepwise or gradually increasing a blending ratio of” the two rubber materials “while holding the same extrusion sectional shape, as specified in claim 1, *see Morris, supra; Zletz, supra*, that “Fig. 1 of Deist does not suggest the invention” and “Fig 2 of Deist also fails to suggest the invention” (brief, page 13). With respect to Fig. 2 and the second embodiment of Deist, appellants allege that “Deist specifically discloses that [rubber types] A, B and C are supplied sequentially, i.e., one pellet feed is started only after the supply of the previous rubber pellets is stopped (see col. 6, lines 60-70), arguing that this disclosure means that the “supply of . . . [one] specific stock of pellet is terminated and the supply of stock of a different pellet is commenced,” that is, the disclosure “suggests that any blending in Fig. 2 of Deist is generally abrupt, not

step-wise or gradually as claimed in claim 1" (*id.*, pages 13-14; reply brief, page 2). In this respect, appellants further allege that "[i]t is noted that Deist does not disclose that two or more different rubber pellets may be added simultaneously but in differing proportions to achieve a step-wise or gradual change," and that "Deist may be inferred not to understand or minimizes the importance of the transition form, or boundary between one composition and a second composition" (brief, page 14). Appellants further point out that Deist **FIGs. 1 and 2** "show completely different ways of supplying rubbers to a calender," and allege that "the way each embodiment works is so unique to each embodiment, the elements of one can not be used to substitute for the elements of the other," contending that the teaching of a gradual change of compositions in the two embodiments of Deist is found only by "[u]sing Applicants' teaching as a template" (*id.*, pages 14-15).

The examiner points out that Deist clearly and unambiguously teaches in, e.g., col. 2, ll. 41-46, and col. 6, l. 70, to col. 7, l. 16, "that the main objective of the reference is to achieve a gradual transition – note col. 1, lines 11-23; col. 2, lines 24-33," and argues that appellants' contrary arguments "ignore and misconstrue explicit teachings in the reference" (answer, pages 10-11).

We agree with the examiner. We find it clear that Deist would have taught one of ordinary skill in this art methods

for preparing rubber material consisting of different type rubber stocks to be applied to a tire carcass wherein a *gradual transition from one type of rubber stock to another is produced* with each type of rubber stock disposed to form a predetermined portion of the rubber material of the finished tire to take most effective advantage of the particular characteristics of each rubber stock and meet the service requirements for each portion of the tire. [Col. 2, ll. 24-33; emphasis supplied.]

Indeed, the teachings of Deist in these respects are as pointed out by the examiner, in addition to which we particularly note the general teachings in col. 2, l. 66, to col. 3, l. 10; the teachings with respect to Deist **FIG. 1**, the first embodiment, in col. 4, ll. 60-75; and the teachings with respect to Deist **FIG. 2**, the second embodiment, in col. 6, ll. 23-36.

We consider the teaching of Deist as a whole and will not read the parts thereof on which appellants rely in a vacuum, which would be necessary in order for us to subscribe to appellants'

position. Accordingly, we find in Deist substantial evidence in support of the examiner's position with respect to this issue.

The next issue raised by appellants involves the claim language "form a laminated rubber member having a given sectional shape by helically winding a *band-shaped* uncured rubber material extruded through an extruder on a rotating support" in the preamble; "a first *band-shaped* member and helically winding the first *band-shaped* rubber member on the rotating support along a rotating axial direction of the support so as to *overlap at least widthwise edge portions* of the wound rubber members with each other to form a first rubber layer" in the first clause; and "a second *band-shaped* member while *holding the same extrusion sectional shape* and helically winding on the first rubber layer while *overlapping with at least a part of the first rubber layer and overlapping at least widthwise edge portions* of the wound second *band-shaped* rubber member with each other to form a second rubber layer" in the second clause of claim 1 (emphasis supplied). In claim 2, a third rubber material is extruded "while *holding the same extrusion sectional shape* and helically wound on the second rubber layer so as to *overlap with at least a portion of the second rubber layer* to form a third rubber layer" (emphasis supplied). Language similar to that of claims 1 and 2 is found in claims 3, 4 and 13.

The result of the language of claim 1 is shown in specification **FIG. 2**, for example, while the result of the language of claim 2 is shown in specification **FIG 3**. See specification, e.g., page 10, ll. 15-22; brief, page 4; reply brief, pages 2-3. While the specification figures suggest a rectangular shaped "band-shaped rubber member," we find no basis in the language of the claims or in the specification to read such a limitation into the appealed claims. All that is required is that the "extrusion sectional shape," which is the "band-shape" of the extruded rubber member, is maintained for each of the extruded rubber layers as required by the language "holding the same extrusion sectional shape." With respect to forming the different rubber layer, all that is required is the "overlap" of the next layer "with at least a portion," however small, of the previous layer. As we determined above, there is no requirement that the extruded band-shaped rubber member is directly wound on the rotating support immediately after extrusion. See *Morris, supra*; *Zletz, supra*.

Appellants submit that Deist fails to disclose a method which would provide the claimed helically wound laminated rubber, alleging that “Deist merely discloses that strip of rubber drawn from a ribbon calender 24 is wound on a surface of a tire carcass (see col. 4, lines 2-5),” and that “Deist merely references Hanson for any disclosure for winding the ribbon onto a tire carcass (see col. 4 lines 15-18),” in support of the contention that “Deist knowing full well the disclosure in Hanson, moved away from using extruders and instead used mills and calendar [sic]” and “fails to suggest anything other than winding the ribbon onto a carcass” (brief, page 15).

Considering this argument first, we find that Deist would have disclosed to one of ordinary skill in the art that

[t]he details of application of strip 35 in the form of a diamond-shaped ribbon to the tire carcass is not illustrated on the drawing [that is, FIG. 1]. Reference may be had to Hanson Patent 2,849,049 for a disclosure of specific techniques which can be employed to wind the ribbon onto the carcass. [[Col. 4, ll. 13-18.]

Deist further would have disclosed to this person that

[a]lthough reference has been made hereinabove to the production of a strip in the form of a generally diamond-shaped cross-section ribbon and to winding this strip on a tire carcass employing techniques as disclosed in Hanson Patent 2,849,049, it is to be understood that the strip made up in accordance with the instant invention and as would on to the carcass may take the form of a wide stripe and possibly a strip of varying width to build the desired tire rubber cross-section. [Col. 7, ll. 17-25.]

On this record, we find it clear that one of ordinary skill in this art would have been led by Deist to wind the diamond shaped ribbon produced in the embodiments thereof by the methods disclosed by Hanson in Patent 2,849,049.<sup>2</sup>

With respect to the teaching of Hanson, appellants contend that this reference fails to show overlapping at least widthwise edge portions of a wound band-shaped rubber members to form a rubber layer, or formation of the second band-shaped rubber member while holding the same extrusion sectional shape and helically winding the second rubber member on the first

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<sup>2</sup> We note that United States Patent 2,849,049 was reissued as Re. 25,349 on March 12, 1963, wherein the only substantive change is in the addition of claims 10 and 11 in the latter patent document. Accordingly, we find that the reference to Hansen in Deist is to the original patent which document was available for that purpose.

rubber layer while overlapping at least a part of the first rubber layer. Appellants finds that Hansen forms “a ribbon of a very small cross section relative to the tire cross section,” wounding the ribbon on the tire carcass “to partially overlap successive turns of the ribbon[,] . . . [t]hat is, Hanson merely discloses that successive turns of the ribbon overlaps previously laid ribbons (see col. 2, lines 45-51 and col. 5, lines 25-30)” (brief, pages 21-22).

Appellants further contend that in helically winding a second band-shaped member on a first rubber layer to form a second rubber while overlapping with at least a part of the first rubber layer, as shown in specification **FIG. 2**, “[r]idges are thus formed on top of the second layer, when the second band-shaped rubber member overlaps with at least a part of the first rubber layer,” that is, “the top of the second layer is not smooth” (reply brief, pages 2-3). In this respect, appellants point to Hansen **FIG. 5**, contending that in winding “a ribbon on a drum, the layers are not simply placed on top of each other as evidenced by the smooth top layer (i.e., ridges are not formed on the top surface),” and that “Hanson fails to wind a second layer on a first layer while overlapping with at least a portion of the first layer” (*id.*, page 3).

Appellants also point out that Hansen does not teach rubber stock blending and other rubber material and rubber layer aspects of the appealed claims (brief, pages 22-23).

Appellants also contend that “Okada fails to show overlapping at least widthwise edge portions of the wound rubber members with each other to form a first rubber layer” and “a second rubber layer,” and forming the second rubber layer by “overlapping with at least part of the first rubber layer,” pointing out that the reference first winds the extruded rubber member on one drum and then on another drum to from the “tire constituent portion” (*id.*, pages 23-24). Appellants find that in Okada **FIG. 3**, strips of materials **12** and **13** are “completely overlapped with a previous strip,” while **FIGs. 4 – 6** show “strips S3, S4, and S5 . . . overlapping previously laid strips,” thus arguing that the reference teaches “overlapping previously laid strips” (*id.*, page 24).

Appellants further point out that Okada does not teach rubber stock blending and other rubber material and rubber layer aspects of the appealed claims (*id.*, page 24).

We find that Deist discloses winding strip **35** “onto the exterior surface of a tire carcass to build up rubber material on the carcass to the desired depth across the surface of the carcass,”

which carcass is rotating, pointing to "the application of strip 35 in the form of a diamond-shaped ribbon to the tire carcass" by Hanson (col. 4, ll. 2-18). Hansen discloses

winding the ribbon continuously on the carcass band and simultaneously controlling relative axial movement of the carcass band to partially overlap successive turns of the ribbon, tread and sidewall portions having exact cross sectional contour and uniform density are built up without requiring trimming or splicing. [Col. 2, ll. 45-51.]

Hansen further teaches that the ribbon must be wound "to prevent entrapment of air between overlapping turns of the ribbon" and "so that each turn of the ribbon partially overlaps the preceding turn in the manner shown in Fig. 5," the figure described as "a fragmentary sectional view axially of the drum showing how the desired tread contour is built up on the carcass" (col. 5, ll. 10-14 and 20-23, and col. 3, ll. 14-16).

Hansen further teaches that diamond-shaped ribbons are of "substantially uniform thickness of rubber when successive turns are partially overlapped," and that

[t]he cross sectional dimensions of the ribbon are governed by the tolerances required in the thickness of the sidewall portion to be formed, and the slope or inclination between the sidewall and tread portions. In other words, the greatest thickness of the ribbon may be substantially equal to but should not exceed the thickness of the sidewall at its thinnest section, so that when a single layer of overlapping turns of ribbon is laid down on the drum, the thickness of the layer will not exceed the desired thickness of the sidewall portion being formed. It is preferable to have the thickness of the ribbon substantially less than that of the sidewall portion so that two or more layers of overlapping turns are required.

The cross sectional width of the ribbon is governed by the steepness of the slope in any portion of the tread T and sidewalls S to be formed. As is apparent from Fig. 5, when the tread portion is formed in the direction of axial movement of the drum must be reversed at proper time intervals, becoming shorter and shorter as the overlapping turns approach the peaks or thickest tread sections. In order to obtain a substantially smooth slope or inclination between the tread and sidewall portions, the amount of overhang between adjoining turns must not be too great, and it is noted that the steeper the slope the narrower should be the ribbons to minimize the amount of overhang.

It should be noted that, since the ribbon coming from the extruder is heated it is very plastic and tacky, so that the overlapping turns as applied by the lay-down device are pressed and conformed together by the lay-down rollers, which smoothes down overlapping edges and produces a smooth outer contour, as well as increasing the bond

between the tacky abutting surfaces as of the overlapping turns with each other and with the carcass. [Col. 5, l. 29, to col. 6, l. 18.]

In these respects, Hansen further discloses that, operationally,

[d]epending upon the relative thickness of the ribbon and the sidewall portion, it may be necessary to reverse the direction of movement of the carriage cross-feed several times on reaching the edges of each sidewall portion, until the overlapped layers are built up to the desired sidewall thickness. . . .

The same procedure is then followed in applying the ribbon of tread stock to the carcass between the already built-up sidewall portions, and the proper tread contour is obtained by reversing the cross-feed at the proper intervals to build up more overlapped layers in the heavier or thicker tread sections.

We find that Okada winds the uncured rubber strip from an extruder on adjusting drum **2** and then unwinds that strip from drum **2** onto building drum **3** to form a tire constituent portion, to maintain the productivity of the strip winding method (e.g., cols. 1-2). Okada “**FIG. 2a** shows a step of shaping a side tread” wherein rubber strip **S1** is wound a plurality of times onto drum **3** while the adjusting drum moves in the direction of the arrow (col. 4, ll. 29-36). We find that one of ordinary skill in this art would have found in **FIG. 2A** that **S1** is wound on drum **3** with at least overlapping widthwise edge portions to form a single layer of side tread **12**. Okada **FIGs. 5a** through **6b** show a sequence of forming an under-tread **18** layer on belt layer **17** with strip **S4** while the adjusting drum moves in the direction of the arrow in **FIG. 5a** with the completed layer shown in **FIG. 5b**, and a cap tread **19** is formed on the under-tread layer **18** with strip **S5** while the adjusting drum moves in the direction of the arrow in **Fig. 6a** with the completed layer shown in **FIG. 6b** (col. 4, l. 63, to col. 5, l. 10). We find that one of ordinary skill in the art would have found in **FIGs. 5a** through **6b** that **S4** and **S5** are wound with at least overlapping widthwise edge portions to form single layers **18, 19**, with layer **19** overlapping with at least a part of layer **18**. We note here that Okada **FIGs. 4a-b** shows forming belt edge cushion **15** and bead filler **16** on carcass layer **14** in similar manner to the showing in **FIGs. 2a-b** (col. 4, ll. 47-61).

We find substantial evidence in the parts of Hanson quoted above, taken in light of the reference as a whole, supporting the examiner’s contention that the reference would have taught one of ordinary skill in this art methods of winding extruded diamond-shaped uncured rubber material onto a rotating support in a single layer, wherein the bands overlap at least widthwise,

and in a subsequent single layer that overlaps with at least a portion of the previous single layer, as required by the appealed claims. We are not convinced otherwise by appellants' arguments with respect to the absence of "ridges" on the second layer, that is, the layer is "smooth," of Hansen **FIG. 5**, because Hansen discloses that the overlapping edges of the layers are smoothed by lay-down rollers. Thus, it would have been apparent to one of ordinary skill in this art that prior to the smoothing steps, the layers, individual and combined, forming the structure illustrated in **FIG. 5** would have had the overlapping structures described in the reference. Therefore, we determine that one of ordinary skill in this art routinely following Deist would have wound the diamond-shaped ribbons taught therein by the methods of Hansen which would have resulted in the overlapping uncured rubber member structures taught by Hansen.

We further find in Okada substantial evidence that further supports the examiner's position. We cannot agree with appellants' contentions that Okada does not teach overlapping the bands in a single layer or the bands of additional layers in view of our findings above with respect to the teachings involving Okada **FIGs. 2a-b, 4a-b** and **5a** through **6b**. We also find no limitation in the appealed claims which precludes a layer of an extruded band-shaped uncured rubber member from overlapping a part or all of a previously laid strip of any kind of material that is on the rotating support.

Turning now to appellants' arguments respecting the individual dependent claims, we find that the arguments presented with respect to each of claims 2 through 4 and 13 are essentially those that we have considered above (brief, pages 16-18, 20, 24-29 and 32-33; reply brief, pages 3-4). For completeness, we point out again here that Deist (e.g., col. 4, ll. 66-75) and Hansen (e.g., col. 5, ll. 49-51) would have taught one of ordinary skill in this art to use two or more layers of extruded band-shaped uncured rubber members which are prepared from different rubber stocks to form a laminated rubber member. Thus, the combination of Deist, Hansen and Okada provide substantial evidence in support of the examiner's position (answer, pages 7-8).

We consider appealed claims 6 and 8 together. We determine that claim 6 specifies that the specific modulus after curing properties of the rubber materials in the layers must differ, while claim 8 specifies that different rubber materials are used for the tread, tread base and tread cap. The examiner is of the opinion with respect to claim 6, that while Deist does not teach

different properties for the different layers, the reference does teach that different materials must have different properties to meet the service requirements for the different parts of the tire, and thus, it would have been apparent to one of ordinary skill in this art that different parts of the tire require different moduli and would have selected different moduli for the parts by routine experimentation (answer, page 7). In the same respects, the examiner points out with respect to claim 8, that the reference discloses the three specified layers for a tread .

Appellants acknowledge that Deist “recognizes the desirability of employing a sizable number of different stocks” for different parts of the tire, but argues that because the reference does not disclose the difference between the rubber types, the reference fails to disclose the claimed invention of claim 6 (brief, pages 18-19). Appellants further contend that Deist fails to disclose a separate rubber for each of the tread parts as specified in appealed claim 8 (*id.*, pages 19-20). Appellants further point out that neither Hansen nor Okada overcome the absence of such teachings in Deist (brief, pages 29-32).

In response, the examiner maintained the position that one of ordinary skill in the art would have optimized the properties of the different rubber materials in the different parts of the tire (answer, pages 11-12).

We agree with the examiner because, like the examiner, we find in Deist the clear motivation to use rubber stocks which alone and as blended provide the “particular characteristics specifically selected as being suited for the predetermined portion of the tire which it forms,” in the manner practiced in the art “for many years” (col. 1, ll. 11-66; *see also*, e.g., col. 2, ll. 24-33, and col. 4, ll. 2-13). Indeed, as the examiner points out, Deist would have taught the use of different rubber stocks, e.g., “cushion rubber stock,” “base rubber stock” and “cap rubber stock” (col. 4, ll. 63-66; *see also* col. 6, l. 70, to col. 7, l. 2).

Accordingly, we find in Deist alone substantial evidence in support of the examiner’s position. Indeed, the recognition in the art that different parts of the tire have different service requirements which necessitates selection of rubber materials of appropriate characteristics to satisfy the service requirements as acknowledged and taught by Deist, would have led one of ordinary skill in the art to select the rubber materials for the parts of the tire which satisfy the such art recognized variables by routine experimentation. *See In re Aller*, 220 F.2d 454, 456,

105 USPQ 233, 235 (CCPA 1955) (“[W]here general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”).

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the combined teachings of Deist, Hanson and Okada with appellants’ countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1 through 4, 6, 8 and 13 through 15 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The examiner’s decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (effective September 13, 2004; 69 Fed. Reg. 49960 (August 12, 2004); 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)).

*AFFIRMED*

*Edward C. Kimlin*

EDWARD C. KIMLIN  
Administrative Patent Judge

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*Charles F. Warren*

CHARLES F. WARREN  
Administrative Patent Judge

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*Beverly A. Pawlikowski*

BEVERLY A. PAWLIKOWSKI  
Administrative Patent Judge

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Appeal No. 2005-0468  
Application 09/347,525

Oliff & Berridge  
P.O. Box 19928  
Alexandria, VA 22320